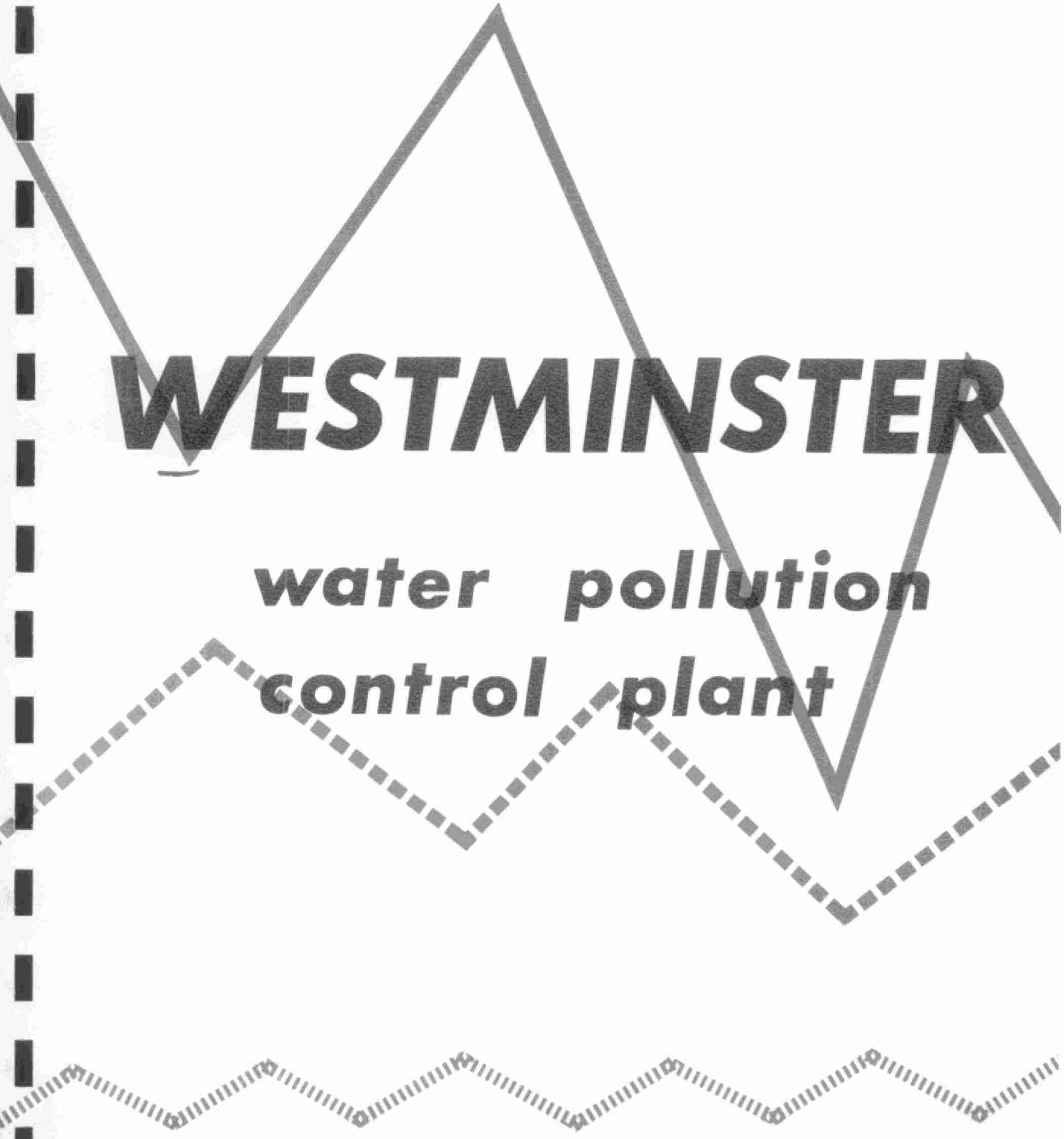
OPERATING SUMMARY



WESTMINSTER

water pollution control plant

1968

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ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

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Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 7
Ontario

We are pleased to present you with the Operating Summary for the water pollution control facilities operated for you during 1968.

Both the financial and technical information presented should be of assistance to your present and future planning in this important phase of municipal activity.

A new format has been devised to allow greater readability with equally detailed content. We trust that this will meet with your approval.

Our staff wish to express their appreciation for your co-operation throughout the year.

D L Caverly
D. S. Caverly,
General Manager.

D McTavish
D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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WESTMINSTER

water pollution control plant

operated for

THE TOWNSHIP OF WESTMINSTER

by the

ONTARIO WATER RESOURCES COMMISSION

1968 ANNUAL OPERATING SUMMARY

FOREWORD

● This operating summary outlines the project's technical capabilities and financial status in 1968. Such information mirrors past and present performance, but a major intention is to anticipate the future -- to solve problems before they occur.

The new format in which this year's data are presented is designed to offer a higher level of readability than in the past, without a corresponding decrease in compactness, accuracy and detail.

Although your Regional Operations Engineer carries the major responsibility for the contents of the report, those involved in its preparation are attached to several Commission sections and divisions. The statistics section of the Division of Plant Operations compiled the information for the graphs and charts. The draughting section of the Division of Sanitary Engineering drew the graphs. The Division of Finance provided all cost data.

Only the close co-operation of these departments allowed the publication of this summary.

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'68 REVIEW

The operating cost for 1968 was $15,471.07, an increase of $1,557.05 over the 1967 cost of $13,914.02. The cost per million gallons treated in 1968 was $203.78, which is higher than the 1967 unit cost of $157.87, but was similar to the 1966 unit cost of $204.81. The cost per million gallons increased due to lower flows and higher salary and repair.

The average daily flow for the year of 200,000 gallons represents a 17% decrease from 1967, and is 80% of the plant capacity. The design flow of 250,000 gpd was exceeded 30% of the time in 1968.

During 1968, the average strength of the raw sewage was 215 mg/l BOD and 252 mg/l suspended solids. The 1967 raw sewage BOD and suspended solids values were 109 and 152 mg/l respectively. The final effluent in 1968 had an average BOD of 14 mg/l and suspended solids of 31 mg/l. These figures represent removal efficiencies of 93% and 88% respectively, compared with 85% for both in 1967.

The Westminster Township plant is operated by a chief operator and a part-time operator. Further assistance and guidance are provided by Ontario Water Resources Commission head office staff as required. During the year, Mr. D. Simpson resigned as chief operator and was replaced by Mr. L. Singer, formerly an operator at the Waterloo plant. Plant supervision is based on a total of 40 hours per week, 36 occurring during the period from Monday to Friday inclusive and for two hours each on both Saturday and Sunday.

Mr. Singer holds his Certificate of Qualification as a sewage works operator which he received in 1968. In October 1968 he attended the OWRC sponsored Chief Operators' Conference.

PROJECT COSTS

NET CAPITAL COST (Final)	$270,727.24
DEDUCT - Payments from Municipalities	65,773.40
Long Term Debt to OWRC	$204,953.84
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1968	$ 57,460.50

Net Operating	$ 15,471.07
Debt Retirement	17,673.00
Reserve	1,029.71
Interest Charged	11,506.80
TOTAL	$ 45,680.58

RESERVE ACCOUNT

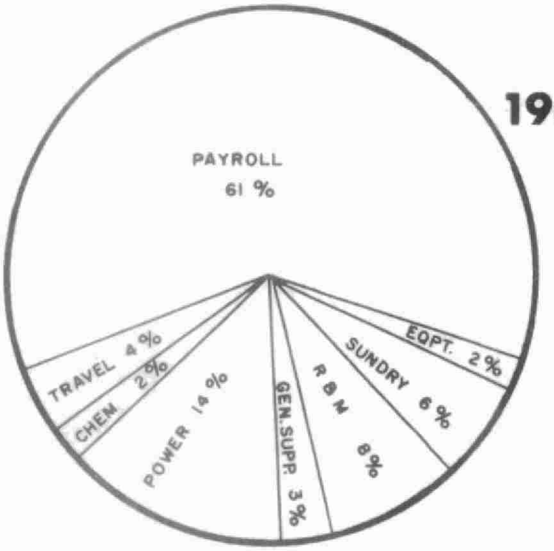
Balance at January 1, 1968	$ 14,988.60
Deposited by Municipality	1,029.71
Interest Earned	908.81
	$ 16,927.12
Less Expenditures	-
Balance at December 31, 1968	$ 16,927.12

Monthly Operating Costs

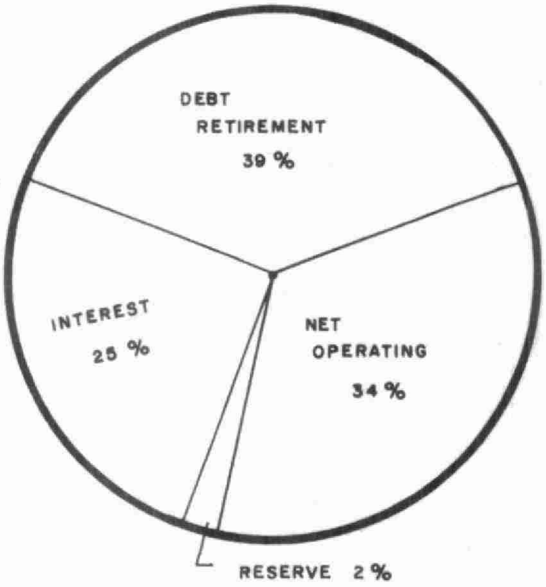
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAY ROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER	TRAVEL
JAN	877.30	457.27	213.19	-	193.18	-	7.25		-	6.41	-	-
FEB	1164.24	457.27	115.02	-	213.28	-	42.16	283.45	-	-	-	53.06
MAR	1222.42	807.22	172.53	-	203.28	-	7.17	(3.75)	-	35.97	-	-
APRIL	1217.79	457.27	245.78	-	189.88	238.61	61.49		24.76	-	-	-
MAY	1844.17	1247.56	352.44	-	176.78	-	5.80		21.53	40.06	-	-
JUNE	1041.63	457.27	164.20	-	158.38	-	78.68		143.20	-	-	39.90
JULY	1199.41	447.06	282.39	-	178.68	-	23.12		86.99	35.57	-	145.60
AUG	1066.36	691.01	278.95	-	-	-	35.59		54.40	6.41	-	-
SEPT	1128.53	447.06	155.60	-	319.26	-	62.63		2.46	6.41	-	135.11
OCT	1209.83	467.48	162.73	-	173.38	-	5.80		-	325.85	-	74.59
NOV	1493.93	518.76	106.24	-	179.93	-	42.36	17.90	449.76	178.98	-	-
DEC	2005.46	732.89	87.51	-	180.53	-	160.06	34.64	442.67	257.66	-	109.50
TOTAL	15471.07	7188.12	2336.58	-	2166.56	238.61	532.11	332.24	1225.77	893.32		557.76

BRACKETS INDICATE CREDIT

1968 OPERATING COSTS



TOTAL ANNUAL COST



Yearly Operating Costs

YEAR	M.G. TREATED	TOTAL COST	COST PER MILLION GALLONS
1964	52.47	$10,748.36	$205.53
1965	55.72	10,614.93	190.49
1966	65.66	13,449.12	204.81
1967	88.08	13,914.02	157.97
1968	75.92	15,471.07	203.78

Process Data

FLOWS

A total of 75.92 million gallons of sewage was treated at this plant in 1968 as compared to 88.08 million gallons in 1967. This is a decrease of 12.16 million gallons or 17%. The average daily flow for the year was 200,000 gallons and represents 80% of the design flow of 250,000 gpd. The maximum average daily flow for a month occurred in April, when the flow was 252,000 gallons, representing slightly more than 100% of the design capacity. The maximum flow in any one day was 550,000 gallons in February. The probability of daily flow graph shows that the design flow was exceeded 40% of the time as compared to 60% in 1967.

The average daily flow graph shows a rapid increase in flows since the plant was put in operation in 1961. The 1968 flow, however, decreased slightly from the 1968 value. It is anticipated that future sewage services in the area will be connected to City of London sewers which are pumped to London for treatment. Therefore, it is expected that the flows at the Westminster plant will remain at their present level for a number of years.

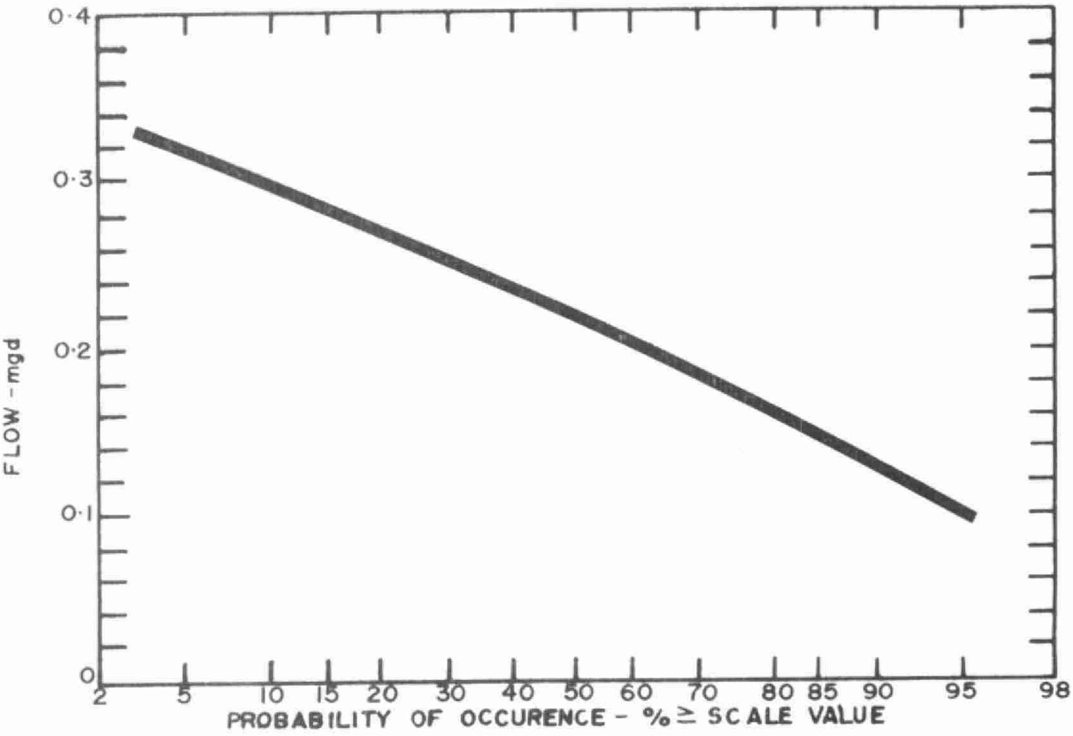
CHLORINATION

A total of 1512 lbs. of chlorine was used at an average dosage of 4.0 mg/l. During the same period in 1967, 1498 lbs. of chlorine were required to maintain the effluent residual of 0.5 mg/l.

PLANT FLOWS and CHLORINATION

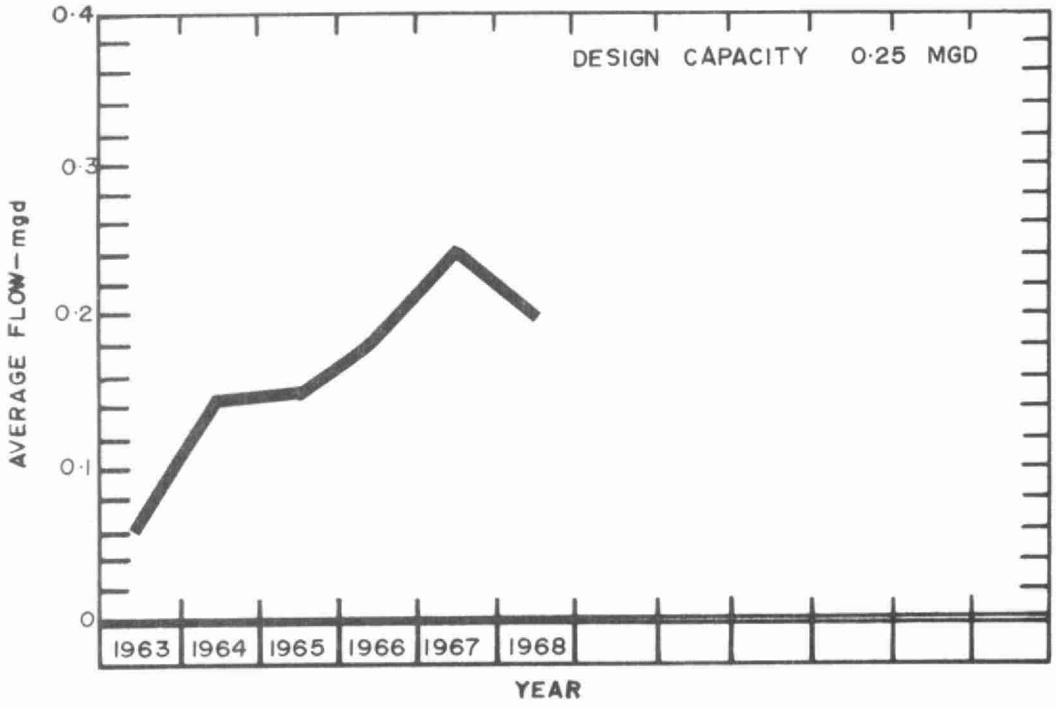
MONTH	TOTAL FLOW mg	AVERAGE DAILY FLOW mg	MAXIMUM DAILY FLOW mg	MINIMUM DAILY FLOW mg	CHLORINE USED lbs.	DOSAGE mg/l
JAN	6.13	.198	.277	.120	0	0
FEB	6.56	.226	.550	.123	0	0
MAR	6.63	.214	.276	.109	0	0
APR	7.57	.252	.391	.112	0	0
MAY	5.48	.177	.300	.086	41	5.8
JUN	6.33	.211	.276	.146	295	4.6
JUL	7.08	.228	.309	.085	294	4.1
AUG	6.70	.216	.321	.075	316	4.7
SEPT	6.32	.211	.319	.080	293	4.6
OCT	6.33	.204	.330	.058	273	4.3
NOV	5.03	.168	.309	.086	0	0
DEC	5.76	.186	.337	.062	0	0
TOTAL	75.92	–	–	–	1512	–
AVERAGE	–	.200	–	–	252*	4.0*

* 5 months' chlorination

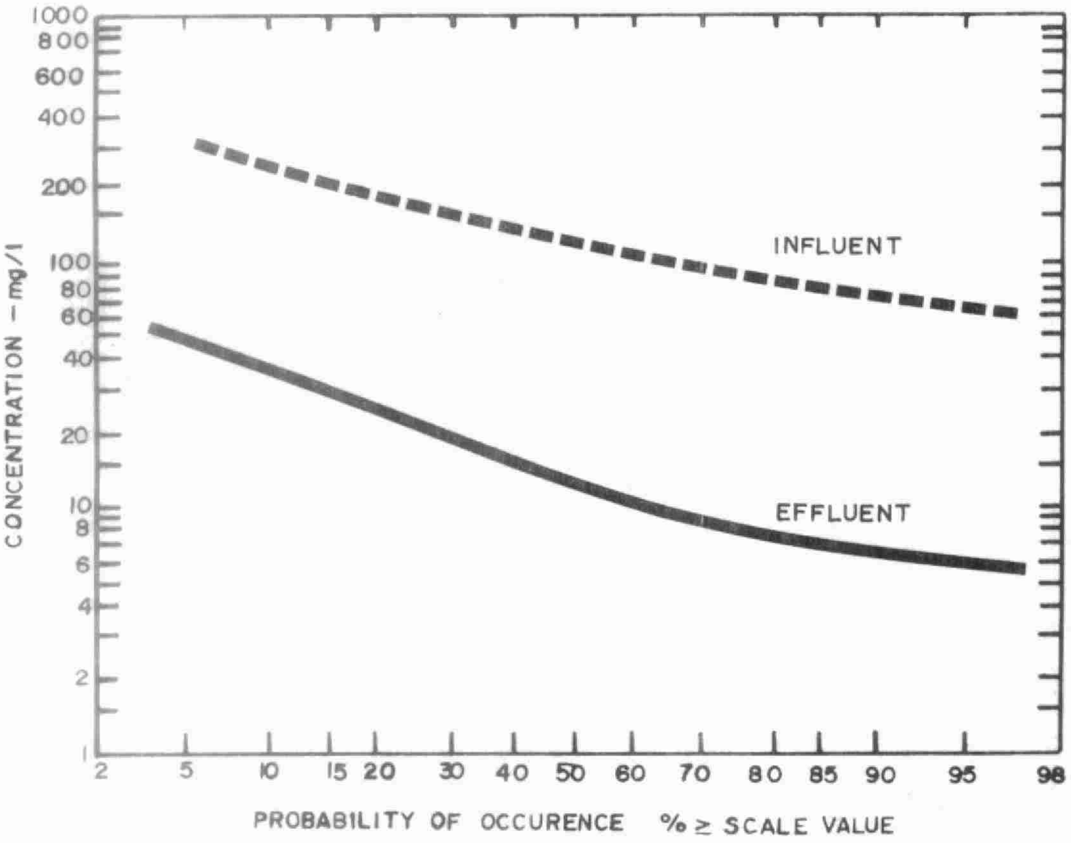


0·4
0·3
0·2
0·1
0
FLOW - mgd
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
PROBABILITY OF OCCURENCE - % ≥ SCALE VALUE

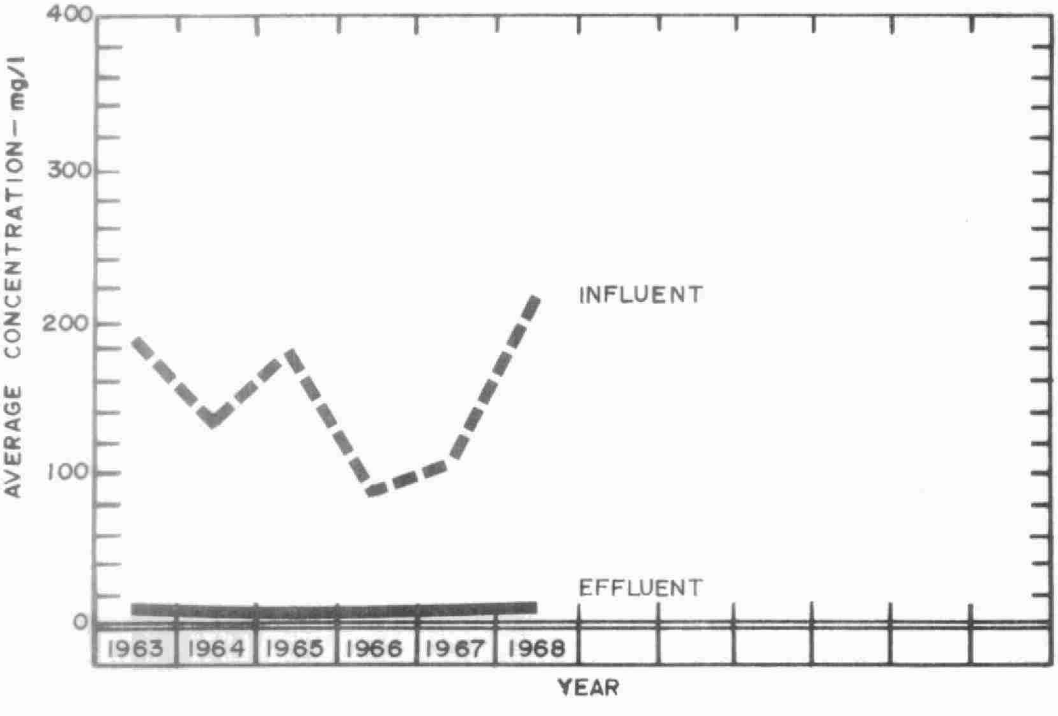
FLOWS

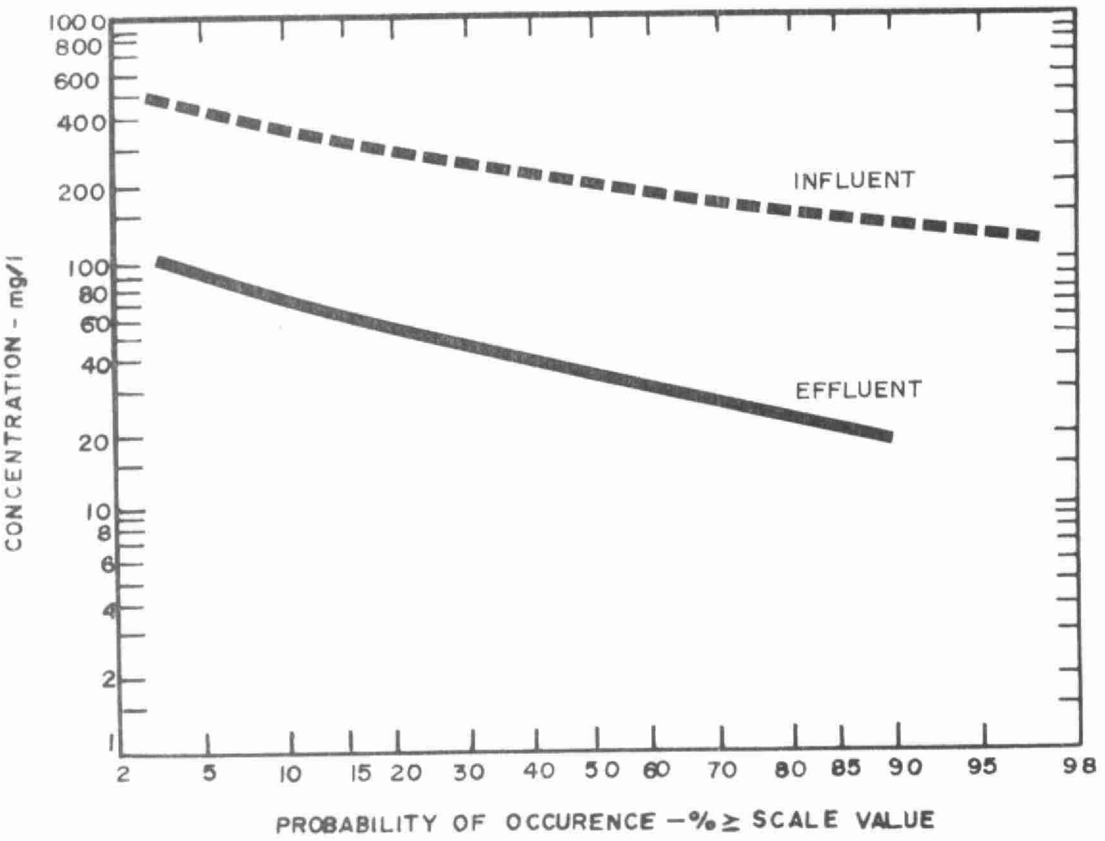


DESIGN CAPACITY 0·25 MGD
0·4
0·3
0·2
0·1
0
AVERAGE FLOW - mgd
1963
1964
1965
1966
1967
1968
YEAR

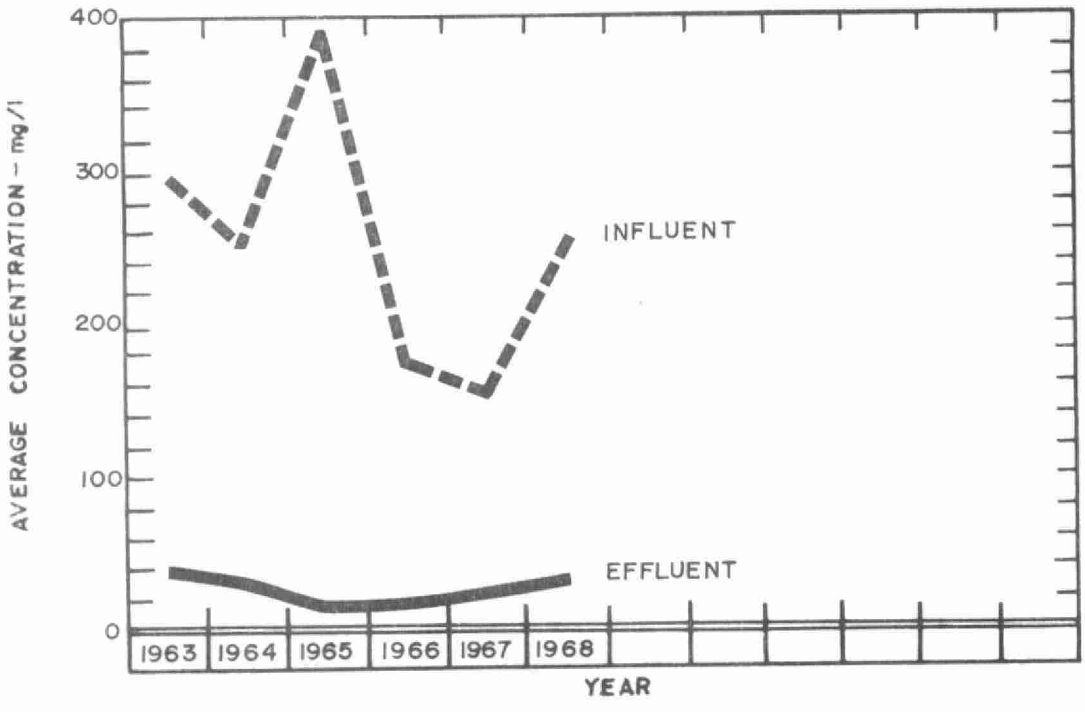


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS



PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT
	INF CONC^N mg/l	EFF CONC^N mg/l	RED^N %	REMOVAL 10^3 lb	INF CONC^N mg/l	EFF CONC^N mg/l	RED^N %	REMOVAL 10^3 lb	REMOVAL ft^3
JAN	113	20	82	5.68	285	34	88	15.4	–
FEB	109	6	94	6.76	211	29	86	11.9	–
MAR	79	13	84	4.40	108	32	70	5.0	–
APR	88	9	90	5.97	143	21	85	9.2	–
MAY	139	6	96	7.32	125	12	90	6.2	–
JUN	185	10	94	10.06	157	8	95	9.4	–
JULY	48	11	78	2.64	92	37	60	3.9	–
AUG	125	24	81	6.75	189	62	67	8.5	–
SEPT	135	21	84	7.20	211	29	86	11.5	–
OCT	715	15	98	4.43	562	55	90	32.1	–
NOV	131	8	94	6.18	212	23	89	9.5	–
DEC	332	21	94	17.91	314	31	90	16.3	–
TOTAL	–	–	–	86.30	–	–	–	138.9	–
AVERAGE	215	14	93	7.10	252	31	88	11.6	–

COMMENTS

The average strength of the raw sewage for the year, based on monthly averages, was 215 mg/l BOD and 252 mg/l suspended solids. The BOD value was much higher than the 1967 value of 104 mg/l and the suspended solids value was also higher than the 1967 value of 152 mg/l. The final effluent had an average BOD of 14 mg/l and an average suspended solids of 31 mg/l which resulted in average reductions of 93% and 88% respectively.

From the probability graph, it can be seen that the effluent BOD met the Ontario Water Resources Commission objectives of 15 mg/l 60% of the time and the suspended solids objective of 15 mg/l only 8% of the time. The above results are based on composite samples taken every two weeks. The high concentration of solids in the effluent can be attributed to interference by industrial wastes.

AERATION

MONTH	AVERAGE FLOW mgd	INFLUENT		SECONDARY EFF		MLSS CONC^N mg/l	F/M $\left(\frac{\text{lb BOD}}{\text{lb MLSS}}\right)$	AIR USED $\left(\frac{1000\ ft^3}{\text{lb BOD REMOVED}}\right)$	WASTE SLUDGE lb
		BOD CONC^N mg/l	SS CONC^N mg/l	BOD CONC^N mg/l	SS CONC^N mg/l				
JAN	.198	113	285	20	34	4,340	.04	2.90	–
FEB	.226	109	211	6	29	4,060	.05	2.01	–
MAR	.214	79	108	13	32	3,380	.04	3.71	–
APRIL	.252	88	143	13	25	3,060	.06	2.67	–
MAY	.177	139	125	76	16	4,800	.04	3.85	–
JUN	.211	185	157	22	18	5,740	.05	1.12	–
JUL	.228	48	92	11	45	4,120	.02	5.12	–
AUG	.216	125	189	23	60	3,990	.08	5.13	–
SEPT	.211	135	211	22	47	4,340	.05	1.61	–
OCT	.204	715	562	14	43	6,210	.05	2.74	–
NOV	.168	131	212	8	23	8,920	.10	2.29	–
DEC	.186	332	314	21	31	7,300	.03	.76	–
TOTAL	–	–	–	–	–	–	–	–	–
AVERAGE	.200	215	252	21	33	5,020	.05	2.83	–

COMMENTS

The average loading on the aeration tank was 0.05 lbs. of BOD per pound of mixed liquor suspended solids as compared to 0.04 lbs. in 1967. The MLSS averaged 5020 mg/l which is lower than the 1967 value of 5360 mg/l. An average of 2830 cu. ft. of air was required per lb. of BOD removed as compared to 3623 cu. ft. of air per lb. of BOD removed in 1967. Part of this decrease is due to the increase in concentrations of BOD and the greater actual number of lbs. of BOD removed.

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CONCLUSIONS

The plant operated at 80% capacity and still has some reserve capacity. It is expected that the installation of a new pumping station, completed in 1968 by the City of London to pump some of the area wastes to the London treatment plant, will stabilize the flows entering the Westminster plant at their present level.

The plant produced an effluent meeting the Ontario Water Resources Commission objectives for BOD, 60% of the time; however, effluent suspended solids only met the objective 8% of the time. When it was possible to utilize them, the sand beds improved the quality of the effluent.

The poor performance of this plant can be attributed to the high percentage of industrial wastes which often create a high solids carry-over in the final effluent. In addition, the type of final clarifier used at this plant will not perform well at the high solids concentration that is used in an extended aeration plant.

Water management in Ontario